Abstract of the Disclosure

A low-temperature nuclear power plant (NPP) spent fuel reactor is disclosed, wherein a core of the reactor is located in a core vessel and is fuelled by NPP spent fuel. The reactor includes a sealing cover and an air-tight shield are located on the top of a core pool, forming at least one air shield. A improves the static pressure and maintains the pressure at the core outlet. An underwater handling canal, is connected with a spent fuel storage pond. This invention uses NPP spent nuclear fuel promoting the utilization value of uranium while providing good safety, economical performance and little or no adverse environmental effects. The reactor can be used for desalination, low-temperature heat supply and isotope production.